

Part I

The Crisis in the United States

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The Financial Crisis of 2007–8 and its Macroeconomic Consequences¹

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The United States and Europe are now in the midst of a significant economic slowdown. It is imperative that we understand what has led to the problem, critical if we are to devise appropriate policy responses—including designing regulatory frameworks that make the recurrence of another such crisis less likely. The cumulative loss in output—the gap between what output would have been had there not been a crisis, and what is actually produced—will almost surely amount to in excess of several trillion dollars before the economy recovers.³

The analysis here is motivated in part by observations of a large number of banking crises, especially in developing countries. In many ways, this financial crisis has similarities to these earlier crises, though certain aspects of the resolution are markedly different. In my book *Roaring Nineties*, I provide an interpretation of the market scandals of the late 1990s and early years of this century. Here, I want to provide a similar interpretation of the 2007–08 crisis, a critique of the policy responses undertaken so far, and a set of proposals for the way forward. In my earlier work, I argued that information and incentive problems played important roles in the financial market scandals of the late 1990s. In this chapter, I want to show that they also have played an important role in the financial crisis of 2007–8.

Financial markets are supposed to allocate capital and manage risk. They did neither well. Products were created which were so complicated that not even those that created them fully understood their risk implications; risk has been amplified, not managed. Meanwhile, products that should have been created—to help ordinary citizens manage the important risks, which they confront—were not.

No one can claim that financial markets did a stellar job in allocating resources in the late 1990s—97 per cent of the investments in fiber optics took years to see any light. But at least that mistake had an unintended benefit: as the costs of interconnections were driven down, India and China became more integrated into the global economy. This time, there were some short-term

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benefits from the excess investments in real estate: some Americans enjoyed the pleasures of home ownership and living in a bigger home than they otherwise would have—for a few months. But at what a cost to themselves and the world economy! Millions will lose their homes, and with that, their life savings. Meanwhile, as families are being forced out of their homes, the homes get trashed and gutted; in some communities, government has finally stepped in—to remove the remains. In others, the blight spreads, and so even those who have been model citizens, borrowing prudently and maintaining their homes, find market values depreciating beyond their worst nightmares.

US banks mismanaged risk on a colossal scale, with global consequences, and meanwhile, those running these institutions have walked away with billions of dollars in compensation. By some estimates, approximately 40 per cent of corporate profits in recent years have accrued to the financial sector. It has played an important role in providing finance to the truly innovative parts of the US economy, through venture capital firms, and these have been well rewarded for their services. But this is but a small part of the US financial system. From a systemic perspective, there appears to be a mismatch between social and private returns—and unless social and private returns are closely aligned, the market system cannot work well.

This chapter provides an analysis of *some* of the sources of the problem, and it provides a set of proposals for the design of a new regulatory framework, which will make the recurrence of such problems less likely in the future. A companion chapter (Responding to the Crisis) provides a critique of current policy responses and suggestions for what *should* be done.

The source of the problem

Many factors contributed to the current problem, including lax regulations and a flood of liquidity. We can push the analysis back, asking why the excess liquidity and lax regulations? What were the political and economic forces leading to each? Elsewhere, I have explained, for instance, how growing inequality, a tax cut for upper income Americans, global imbalances, and rising oil prices contributed to what would have been—in the absence of loose monetary policy and lax regulation—an insufficiency of aggregate demand, in spite of large fiscal deficits. I explain too the role played by monetary policies, which focused excessively on inflation and paid insufficient attention to the stability of financial markets; these policies were often justified by simplistic economic theories.⁴

Here, I focus more narrowly on how particular deficiencies in the regulatory framework contributed to the housing bubble, focusing in particular on the *supply side*, the behavior of lenders. There were other regulatory failures, which contributed on the demand side—the failure, for instance, to restrict predatory lending.

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Some of the same problems that had contributed to the earlier problems were at play here. There were incentives for providing misleading information and conflicts of interest. Two additional elements were present: incentives for excessive risk-taking and fraudulent behavior (a problem that played an important role in the savings and loans, S&L, debacle).⁵ Perhaps more important though than these perverse incentives was a failure in modeling: a failure to understand the economics of securitization and the nature of systemic risk, and to estimate well small probability events.⁶

Incentive problems

EXECUTIVE COMPENSATION SYSTEMS

Executive compensation schemes (combined with accounting regulations) encouraged the provision of misleading information. Executives that are paid with stock options have an incentive to increase the market value of shares, and this may be more easily done by increasing reported income than by increasing true profits. Though the Sarbanes-Oxley Act of 2002 fixed some of the problems that were uncovered in the Enron and related scandals, it did nothing about stock options. With stock options not being expensed, shareholders often were not fully apprised of their cost. This provides strong incentives to pay exorbitant compensation through stock options.⁷ But worse than this dissembling, the use of stock options encourages managers to try to increase *reported* income—so stock prices rise, and with the rise in stock prices, so too does managers' compensation; this in turn can lead them to employ bad accounting practices.

In addition, stock options—where executives only participate in the gains, but not the losses—and even more so, analogous bonus schemes prevalent in financial markets, provide strong incentives for excessive risk-taking. By undertaking high-risk ventures, they might garner more profits in the short term, thereby increasing compensation; but subsequent losses were borne by others. In a sense, they were designed to encourage risk-taking. The problem is that they encouraged *excessive* risk-taking, because of the mismatch between private returns and social returns.

Accounting frameworks exacerbated these problems. Banks could record profits today (and executives enjoy compensation related to those profits), but the potential liabilities were placed off the balance sheet.

INCENTIVES FOR ACCOUNTING FIRMS

The Enron/WorldCom scandal brought to the fore long recognized incentive problems with accounting (auditing) firms, and some clear conflicts of interest. Hired by the CEOs, and with much of their pay related to consulting services, they had an incentive to please the CEOs—to improve accounts that overstated

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profits, which led to higher share value, and greater CEO compensation. Sarbanes-Oxley took important steps to improve matters—the accounting firms were limited in providing non-accounting services, and they were hired by the audit committees of corporate boards. Yet, few thought that this would fully resolve the problems. Boards, including audit committees, are still often beholden to the CEO, and typically see the world through lens provided by the CEO. Accounting firms still have an incentive to please the CEO and the companies that hire them. This may provide part of the reason that the accounting firms did not do the job that one might have hoped in exposing off-balance sheet risks.

SECURITIZATION

Recent years have seen increasing reliance on markets, including securitization, and a decreasing reliance on banks for the provision of credit. Much of the attention has focused on the greater ability of markets to diversify risk. Markets, by underestimating the extent to which these risks were correlated, overestimated the risk diversification benefits. Meanwhile, markets ignored three other problems.

As early as the 1990s (Stiglitz, 1992), I questioned this move to securitization. Securitization creates new information asymmetries—banks have an incentive to make sure that those to whom they issue mortgages can repay them, and to monitor behavior to make sure that they do (or that the probability that they do is high). Under securitization, the originator only has an incentive to produce pieces of paper that it can pass off to others.⁸

The securitization actually created a *series* of new problems in information asymmetries: the mortgages were bought by investment banks, repackaged, with parts sold off to other investment banks and to pension funds and others; and parts retained on their own balance sheet. In retrospect, it was clear that not even those creating the products were fully aware of the risks. But the complexity of the products made it increasingly difficult for those at each successive stage of the processing and reprocessing to evaluate what was going on.

Securitization poses two further problems. It may make renegotiation more difficult when problems arise. It is impossible to anticipate fully all contingencies, and to specify what is to be done in each in the loan contract. When the borrower cannot meet his repayments, it may be mutually beneficial to renegotiate—the costs are lower than default (foreclosure on a mortgage). Yet such renegotiation may be more difficult under securitization, when there are many creditors, whose interests and beliefs differ. Some may believe that by bargaining hard, they can get more on average, even if it means that some of the loans will fall into default. This is especially the case when those who assume the risk do not trust fully those who manage the loan to act in their behalf; they may

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worry that their incentives (related to management fees) are not fully in accord with the creditors', and so may impose restrictions on renegotiations. Moreover, the banks may have a richer "information" context with which to evaluate the problems; they can more easily ascertain whether the default is a "strategic default" (where the borrower is simply trying to have his debt burden reduced), and whether a loan restructuring—deferring repayments—will allow the borrower eventually to repay, or whether it will simply mean that the cumulative loss will be greater. Especially in the litigious US context, renegotiation has proven difficult, because any creditor has an incentive to sue those responsible for renegotiating saying they could have done a better job.⁹ This problem should have been anticipated: it was far harder to renegotiate the securitized debt in the 1997–8 crisis than to renegotiate the bank debt in the Latin American debt crisis of the 1980s.

The second is that the new securities that were created were highly non-transparent. Indeed, their complexity may have been one of the reasons that they were so "successful." In the East Asia crisis, there was a great deal of criticism of the countries of East Asia for their lack of transparency. But it was precisely this lack of transparency that had, in some sense, attracted investors to these countries. They believed that they had "differential information" which would allow them to get above normal (risk adjusted) returns. In addition, it was the complexity of the product that helped generate the "supernormal" returns. Participants in New York's financial markets put their trust in the reputations of these premier financial institutions and the rating agencies. They have reason to be disappointed.¹⁰

RATING AGENCY INCENTIVES

The rating agencies had been widely berated for their failures in the 1997 global financial crisis. They had underrated the risks in East Asia; but as they became so large that they could no longer be ignored, their sudden downgrading of these assets forced them to be sold by pension funds and other fiduciaries. They had clearly contributed to financial market instability.¹¹ It seemed strange, given this record, that Basel II put such stress on rating agencies¹². The rating agencies again failed.¹³ They played a critical role: their *financial alchemy*—converting C-rated sub-prime mortgages into A-rated securities safe enough to be held by pension funds—ensured a continuing flow of funds into these mortgages. Not unlike medieval alchemists who believed there was money to be made by converting base metals like lead into gold, there was plenty of money to be made—and shared by all involved in the process—in the conversion of these assets.

Part of the problem is again flawed incentives: Rating agencies—paid by those who they were rating—had an incentive to give them "good grades"¹⁴ and to believe in the ability of the investment banks to successfully engage in financial alchemy.

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NEW CONFLICTS OF INTEREST AND A NEW CULTURE: REPEAL OF GLASS-STEAGALL

During the discussion of the repeal of the Glass-Steagall Act, critics had worried about conflicts of interest which might open up as a result of the breaking down of the barriers between investment and commercial banks. Advocates had said, "Trust us." Besides, they said, we will construct Chinese walls, to make sure that there are not abuses. Critics were (as it turned out, rightly so) skeptical; and raised the question: if effective Chinese walls were constructed, where were the economies of scope that provided the rationale for the mergers? (see Stiglitz, 2003).

That the elimination of the barriers between investment and commercial banking provided more scope for conflicts of interest was amply demonstrated by the Enron/WorldCom scandals, e.g. the commercial division lending to firms that the investment division had issued IPO's, in order to make them seem more "viable."¹⁵

Was it just an accident that so many problems in the financial system surfaced so soon after the repeal of Glass-Steagall in 1999? These conflicts of interests may have not been at the center of the problem, but they clearly played a role—so too in the 2007–8 crisis. Indeed, the closer interplay between investment banks and commercial banks almost surely contributed to the necessity of the Fed bail-out of Bear Stearns. It was not just a few investors' wealth that was at stake should Bear Stearns fail, but the entire financial system.

There have been other effects of the integration of investment and commercial banks that almost surely played a role in the debacle. The culture of conservatism that had traditionally dominated commercial banking came into clash with the speculative drive of the investment banks, and it was the latter culture that dominated.¹⁶

THE BERNANKE-GREENSPAN PUT AND MORAL HAZARD

Economists have long been aware of the distorted incentives that bail-outs provide. If a bank gambles (e.g. by making risky loans) and wins, the shareholders keep the gains. If a bank gambles and loses, there is a limit to the losses. The government picks up the pieces.¹⁷ That is one of the reasons for the need for close supervision of banks; just like a company providing fire insurance needs to make sure that those insured have sprinklers, to reduce the extent of losses, so too the government, which either implicitly or explicitly is providing insurance, needs to make sure that banks are not engaging in excessive risk-taking.

Allowing the banks to grow in size and to become so interdependent exacerbated the risk of being "too big to fail," and therefore the risk of bail-out. The repeated bail-outs—including of a hedge fund, LTCM (Long-Term Capital

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Management)¹⁸—made it clear that the United States would not let one of its major financial institutions fail.

The Fed has now extended the coverage of bail-outs (“lender of last resort”) to investment banks, exacerbating all the problems to which we have already called attention.

Though the adverse incentive effects of bail-outs are clear, it is not always so clear who benefits from them.¹⁹ The question is, what would have happened were there not a bail-out? Who is better off? Who is worse off? Clearly, taxpayers are worse off: at the very least, they have assumed risks that would otherwise have been borne by others. The full answer depends in part, of course, on the terms of the bail-out. For instance, in the discussion below of the bail-out of Bear Stearns, those who would have lost money if Bear Stearns had gone under are better off. Bear Stearns shareholders are better off than they would have been had it gone under. Those who had “bet” on Bear Stearns going under are worse off. Part of the reason that it is difficult to get a fully satisfactory answer to this question is that there is uncertainty about what would have happened if there had not been a bail-out. If it would have led to a cascade of other failures, then all of those who otherwise would have gone under have benefited.²⁰

CREATING A CREDIT FREEZE

Even before September 15, 2008, and the real freezing of credit markets following the bankruptcy of Lehman Brothers, it was apparent that credit markets were not functioning properly. The reason for the malfunctioning was transparently the lack of transparency: they were so non-transparent that when problems began to surface, no bank knew what its own balance sheet looked like, let alone that of a bank to which it might lend.

There is a striking similarity between what happened after Lehman Brothers was allowed to go bankrupt and the outcome of IMF (International Monetary Fund) and US Treasury policies in Indonesia’s banking crisis of 1997. At that point, 16 banks were shut down; the IMF made it clear that others would follow, that it would not disclose which banks would close, and that there would be at most limited deposit insurance. What followed was a panic, as funds fled the private banks.

This time, it was already evident that many banks were in serious difficulties. The presumption was that the government would bail out at least the larger banks. By allowing Lehman Brothers to go into bankruptcy, the Treasury and Fed were, in effect, saying: “Other banks will be allowed to fail; we will not tell you which we will allow to fail and which we will not. But we will not provide any guarantees.” What followed was a predictable panic.

Problems were made worse by large counterparty risks, with huge outstanding positions. Again, the analogy to 1997 is instructive. Some Korean banks

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believed that they had purchased insurance against exchange rate changes, but they had failed to assess counterparty risk. In the complex web of interdependence, a failure of one institution could lead to a failure of others. One could not tell who was or was not financially viable, because one could not assess which “insurance” policies would or would not pay off.²¹

TRANSPARENCY AND COMPLEXITY

Much attention has been centered on the lack of transparency of financial markets. But it is not just the lack of transparency that is key, but also the complexity of the products created: even if the terms of the contracts were fully disclosed, it would be difficult to assess fully their import.

It should be clear that there are strong incentives for complexity (and lack of transparency). The more transparent and standardized markets are, the more competitive, and profit margins are lower. Lack of transparency and high levels of complexity were thus a central part of the business model of US financial institutions.

At the same time, it should be clear that increasing transparency (improved information) will not necessarily lead to greater market stability (see Furman and Stiglitz, 1998). More deeply, the forces that have given rise to the current crisis will not be resolved simply by increasing transparency. The incentives that gave rise to lack of transparency (see Edlin and Stiglitz, 1995) and increased complexity would still be at play. Deeper reforms are required.²²

INCENTIVES—AND OPPORTUNITIES—FOR FRAUD

It should have been obvious to almost anyone involved—from those originating the mortgages, to those repackaging and securitizing them, to the rating agencies, and to the regulators—that there was something very wrong going on. Some of the mortgages required no documentation, and no down payments. With some of the appraisal companies owned by the mortgage originating companies, there were clear conflicts of interest. A structure was in place for fraudulent behavior—for loans greater than the value of the house—and it is clear that such fraudulent behavior did occur.²³ Incentives matter, and if there are perverse incentives, there are perverse outcomes.

Both the regulators and those buying these securities should have been suspect: a 100 per cent non-recourse mortgage is an option—if the price of the house goes up, the owner keeps the difference, if it goes down, he walks away. Providing such mortgages is equivalent to giving away money. But banks are not traditionally in the business of giving away money, especially to poor people. How can one make money by giving away money? The answer was simple: they were in the business of creating pieces of paper that they could pass on to others. As the expression goes, a fool is borne every moment, enough to create a market: especially when these fools are aided and abetted by wise men,

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with strong reputations, rating agencies and long established investment banks.

Not all of the mortgages provided, in effect, 100 per cent financing.²⁴ This provided another incentive for bad behavior. Much has been written in recent years about the amount of money that lies at the bottom of the pyramid, and US financial institutions were determined to extract as much of that money out as fast as they could. Many put their life savings into the purchase of their homes—money that in effect went to pay commissions to the mortgage brokers and others who benefited from the housing boom so long as people continued to finance and refinance their homes. They walked away with their commissions, no matter what happened to housing prices; it was the poor that were left to bear the risk.

Many recognized that there was predatory lending going on. Not surprisingly, the predation was especially strong among those who were financially not well educated. There were attempts to stop this predatory behavior, but lobbyists for those who were doing well by exploiting these groups prevailed.

WHAT WAS GOING ON? REGULATORY AND ACCOUNTING ARBITRAGE? MISPRICING RISK AND EXCESSIVE LEVERAGE?

Incentives clearly played an important role in the debacle. But even with (conventionally defined) well designed incentives, problems may have occurred, because social and private returns differed. There were opportunities for regulatory arbitrage. If, for instance, one could somehow convert the C-rated sub-prime mortgages into A-rated securities, then one could open up a huge potential demand from fiduciaries that could not otherwise have purchased these assets. The gains from regulatory arbitrage were large, ample enough to pay everyone along the production chain, from the rating agencies (that gave their seal of approval), to the investment banks (who did the repackaging), to the mortgage brokers, who manufactured the pieces of paper to be repackaged.

Accounting anomalies (especially with stock options) provide further opportunities for “arbitrage,” such as booking profits on repackaging, while retaining some of the unsold assets and the implicit risks off-balance sheet.

Some of what was going on was a new version of an old game: leverage. With high leverage, one can make large profits on a limited amount of capital—if things turn out right. The new instruments allowed, in effect, very high leverage, in a non-transparent way. There were points of high leverage throughout the financial system, from the homeowners with low down payment homes upwards. But one of the insights of modern finance theory (from Modigliani-Miller onwards) is that there is no money to be made in leveraging in a well-functioning financial market. The risk increases with the leverage, and if

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markets are pricing assets correctly, there is nothing to be gained in risk adjusted returns.

To put it another way: trading in securities markets is (approximately) a zero sum game. The profits of the winners are matched by the losses of the losers. There are social returns only to the extent that there is finely honed matching of risks; the scale and nature of the transactions suggests that *that* was not what was going on. Rather, there seems to have been massive deception and self-deception that somehow something real was going on, generating enormous net real value.

Modeling Problems

Still, many of the mistakes of the financial markets (including the banks and rating agencies) are attributable not to bad incentives, but to bad models—mistakes in modeling that were and should have been obvious before the collapse (bad incentives may well have encouraged them to adopt faulty models). They failed to understand the perverse, predictable and predicted, consequences of the incentive structures that they had created (described above).

FAILING TO UNDERSTAND DIVERSIFICATION

Market participants (including banks and rating agencies) systematically ignored (or underestimated the importance of) systemic risk. They thought that securities consisting of a large number of mortgages would have a small probability of losing more than, say, 10 per cent of their market value. Based on recent history, what was the probability of large numbers going into default at the same time?

They failed to realize that diversification has only limited value when risks are correlated; a fall in the price of housing, a rise in the interest rate, and an economic downturn all could give rise to correlated risk—an increase in the default rate. The 2007–8 sub-prime mortgage crisis was not the first time that financial markets seemed to have underestimated both systemic risk and unlikely events. Once in a century problems seemed to be happening every ten years.

These failures were multiplied with default insurance. If the products being insured had correlated risks, then the net worth of the insurance companies would be insufficient to make good on their promises. We have seen this play out: as the insurance companies have lost their ratings, the products that they insured have lost their ratings, in a cascading of down-grading.²⁵

FAILING TO UNDERSTAND SYSTEMIC RISK—A CRITICAL FAILURE OF THE BASEL II FRAMEWORK

Basel II required banks to manage their own risks—as if that is what they would not have done on their own. It presumed that the regulators could monitor

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complicated risk management systems of banks, and that the rating agencies could assess risk. It is now clear that banks did not know how to manage risks and that the rating agencies did not know how to assess risk (or did not have the incentives to do it well).

But there was a more fundamental flaw with the Basel II framework. Banks obviously *should* have incentives to manage their risks. Regulators needed to focus on those areas where individual private risk management might not accord with managing social or societal risks well.

One obvious example is provided by what happened (and what had happened earlier, in 1987): if all banks are using similar risk management systems, they may all try to sell certain assets in particular contingencies, in which case they can't; prices fall in ways that were not anticipated. Using similar risk management systems can give rise to correlated risks, with far larger than normal price movements.²⁶

Banks have been criticized for using the same (or similar) models.²⁷ That is not really the key issue: indeed, if they are all using the right model, based on rational expectations, then they would have to be using the same model.²⁸ The problem was that they were all using similar wrong models. They were using models that were not consistent with rational expectations; they were all using models that were such that, if they all used that model, the outcome could not have been consistent with the models themselves.

There was a role for the regulator: at the very least, it could have checked the consistency of the models. Each firm may have been unwilling to share its model with other firms—they presumably believed that their ability to manage risk well may have given them a competitive advantage over other banks. But they can be required to share their model with the regulator, who can assess the systemic implications, and the consistency of the models with systemic behavior.

More generally, it was a major failing of Basel II not to recognize that there are systemic externalities—presumably one of the reasons for regulation in the first place.

DETECTING PONZI SCHEMES

In this crisis, as in many earlier crises, a little thought about the economic situation should have revealed that what was going on was not sustainable. Understanding why this is the case may be as much a matter of social psychology as of economics. Market participants reinforce each others beliefs about the “correctness” of their views. But certain short sighted and dysfunctional aspects of markets may play a role. For instance, those who did not engage in the “game” would not have had as high returns on their equity—and stock prices would have suffered. Even without distorted incentives, a bank that resisted the conventional wisdom would have been the subject of a take-over move.

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Behind the scenes, somewhat obfuscated by the financial market “innovations,” were two classic problems: excessive leverage (typically in a non-transparent form) and a pyramid scheme. Everything might have worked well if house prices had continued to rise. Those who borrowed beyond their ability to pay would have made sufficiently large capital gains that they could have repaid what was owed. Those who lent without due diligence would have done just as well as those who had.

With many loans having in effect negative amortization, the borrowers owed more at the end of the period than at the beginning. Some expressed concern about what would happen when they had to pay the full interest due (as in most of the loans, after an initial period of “teaser rates.”) They were told, not to worry: they would easily refinance the loan. They would then even be able to spend some of the capital gains, through mortgage equity withdrawals.

But it should have been obvious that it was unlikely that prices could have continued to rise, even without an increase in the interest rate. Real incomes of most Americans have been declining. Yet median house prices (even adjusting for overall inflation) were increasing, and dramatically so. There was an obvious limit to the amount that can be paid for housing. Anybody looking carefully at housing prices saw that what was going on was not sustainable. How could prices (adjusted for overall inflation) continue to rise, as real incomes of most Americans, and especially those at the bottom, continued to fall? Everyone in the system should have realized that they were engaged in a classical pyramid scheme.

INTELLECTUAL INCOHERENCE

It should have been obvious that there was something wrong with the reasoning underlying much of what was going on in the financial markets. The failures to recognize the problems make it difficult to reconcile behavior with any notion of market rationality.

Those creating the new products argued that the new financial instruments were fundamentally changing the structure of the economy—it was these fundamental changes which presumably justified their huge compensation. But at the same time, they were using data from before the introduction of these new instruments to estimate the parameters of their models, including the likelihood of default. If it were true that they had opened up a new era, surely these parameters would have changed.

How could they not have recognized that securitization had altered incentives? How could they not have responded by tightening monitoring? How could they not have recognized that there was something peculiar about the non-recourse mortgages that were being issued? How could they not have recognized the perverse incentives to which the short sighted and asymmetric incentive systems were giving rise? Some academics did raise questions about

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each of these aspects of the market, but “the market” studiously ignored these warnings.

There were other examples of intellectual incoherence. One of the reasons for the drying up of interbank credit flows was the large derivative positions. The banks had failed to net out these positions. When asked why, the response was that it was “easier” to undo a derivative position by creating a new offsetting position. The two were equivalent, so long as there was no bankruptcy, and no one could imagine the bankruptcy of one of the major banks. Counterparty risk was assumed away.

Yet, among the fastest growing parts of the derivative market were credit default swaps—bets on whether one of the major banks would go bankrupt. Surely, they must have recognized the enormous mess that would have been created by the default of a major bank, and that failing to net out positions was giving rise to enormous systemic risk.²⁹

Perhaps most significantly, many in the financial market argued that financial markets were relatively efficient, believed in the Modigliani-Miller theorem, understood that there was no such thing as a free lunch, and yet were still unfazed by the huge returns accruing to the financial sector. These were presumably the just rewards for increasing the ability of the economy to allocate resources and manage risks; and yet where were the corresponding improvements in the *real economy*? The only thing that could be pointed to was the unsustainable increase in investment in sub-prime housing.

The failure of the financial system to perform its essential functions: what were they doing? Regulatory arbitrage?

In short, it is hard to reconcile what happened in that episode (as in the earlier ones) with any model of “rational” behavior. But whether rational or irrational, failures in financial markets in the late 1990s and in 2007–8 have highlighted the importance of information imperfections. In each instance, the results were clear: the financial system failed to perform the functions which it is supposed to perform, allocating capital efficiently and managing risk. In the late 1990s, there was massive excessive investment, say, in fiber optics; in the first decade of this century, there was massive excessive investment in housing. And while new products were created to facilitate the management of risk, they actually created risk.

While they were creating risks with their new products, they were not creating the products that would help manage the socially important risks that needed to be managed. They were (for the most part) not creating risk products that were tailored to the needs of those that needed to have risk managed (their failure to manage their own risks suggests that they might not have had the competence to do so, even if they had wanted to). In many cases, funds would buy the new derivative products as part of portfolios. Sub-prime mortgages and

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other assets were being sliced and diced, and then recombined, and the resulting products would then be mixed with other similarly artificially constructed products—and no one could easily ascertain the risk properties of the resulting portfolio. As I suggest below, they were not really managing risk; they were engaged in regulatory arbitrage.

There were real social needs for risk management, evidenced by the fact that millions of Americans may lose their homes.³⁰ The new mortgages increased the risk borne by poor homeowners of interest rate fluctuations and credit market conditions. This was especially true of those mortgages with reset provisions or balloon payments, which were often sold on the presumption that the individuals could refinance their mortgages. There are alternative mortgages that would have shifted more of the risk to the market or made it easier for individuals to manage these risks (e.g. mortgages with variable maturities but fixed payments.)

One hypothesis about what was really going on—beyond a fancier and hard to detect pyramid scheme, or the newest form of accounting deception, to replace those that had been exposed in the Enron/WorldCom scandals—is that this was a fancy version of regulatory arbitrage. The problem facing financial markets was how to place the high risk sub-prime mortgages that were being created into sources of funding, many of which were highly regulated (such as pension funds). These are regulated for a good reason: these institutions are fiduciaries, entrusted to make sure that funds are available for the purposes intended, including financing individuals' retirement. They are, accordingly, not allowed to speculate on highly risky securities. The bonds they invest in must have a high rating. These regulations give rise to the demand for financial alchemy. If poorly rated sub-prime mortgages could somehow be converted into an asset with a high enough rating to be placed in pension funds and other fiduciaries, there was money to be made: if these assets could yield a slightly higher return than other comparably rated bonds, then there was an insatiable demand. The difference between the return on the low rated sub-prime mortgage and the AAA products created by financial alchemy provided billions of dollars to be divided among all those participating in the scam—from those originating the mortgages (both the companies and those who worked for them), to those who did the repackaging, to the rating agencies.

Someone, everyone had forgotten the oldest of economic adages: there is no such thing as a free lunch. Evidently, in their minds, money had been left on the table for decades, and only the power of modern finance had found it. Where were the billions of dollars of true welfare gains that corresponded to the billions of dollars of apparent profits, bonuses, and commissions coming from? Never mind, if no one could find a good answer.

There was, of course, a simple answer, provided by the capital gains based pyramid scheme—some were cashing in on the gains, leaving the future losses to others. At the same time, it became clear that financial prowess had created

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not only new vehicles for what might be called systemic deception, but had exposed a deeper problem within the capitalist system. It was difficult at best to tell who was managing assets well, who was taking a long run gamble that would pay off well to the fund manager, but likely at the expense of those whose funds he was managing. One could create assets that had a low probability of a large loss. Assume, by way of example, that an asset had a 95 per cent probability of a return that was above normal by 1 per cent—in conventional terms, “almost certain”—but a 5 per cent probability of a loss of x per cent. If $x > 20$ per cent, the expected return to this risk asset is actually less than a safe asset. But on average, it will take twenty years before finding out the value of x . It will be 20 years before one finds out whether the 1 per cent excess return is enough to compensate for the loss. But, of course, the hedge fund managers are paid not on the basis of 20-year performances; they walk away with the positive returns, regardless of the loss that occurs in that twentieth year.

Preventing future crises: reforming financial regulation

As we have repeatedly emphasized, there is a compelling argument for regulation: the actions within the financial sector have effects on *others*, and government (partly as a result of this) will have to bear the costs of mistakes. Just as fire insurance companies must regulate those they insure, requiring them to have sprinklers, so too government, as *insurer of last resort*, must do what it can to lower the probability of the (implicitly or explicitly) insured against event occurred.³¹

It is clear, for all the best intentions, that regulations imposed in the past have not worked, and as we think of new regulatory systems, we have to think of the reasons for the failure of past systems. At least three factors play a role: (a) recent beliefs—grounded neither in economic theory, or historical experience—in self-regulation (that market discipline ensures that only the best survive) has resulted in deregulation; (b) regulatory capture—the regulatory mechanism has been captured by those that it is supposed to regulate, especially common in the international context; and (c) a lack of understanding of finance and accounting has led to regulatory frameworks that are open to regulatory arbitrage and manipulation. In addition, there is always a lack of balance: there is no comparison between the compensation of the regulators and those they are supposed to be regulating. This may contribute to regulatory capture, but it should be clear—it does not make regulation infeasible. We have a tax system which collects taxes, even though those paid to avoid taxes are paid far more than the tax collectors. But an understanding of this imbalance has implications for the design of the regulatory system.

There are two more challenges facing the design of the regulatory system. We want to encourage innovation, and we want to promote macro-stability. We

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have noted earlier how some regulations, for instance, may act as automatic destabilizers.

Finally, in our world of globalization, each country worries about competition. There is a worry this will generate a race to the bottom. I believe that good regulation is, or can be, a competitive advantage. Singapore has attracted funds because those putting money into that country have some confidence that its banks are viable. But just as actions of banks have externalities, so too do regulatory frameworks, and it would be best if there were coordinated actions in adopting good regulatory frameworks. But if this is not achieved, I argue in the final subsection, Europe and the United States have sufficient economic influence to ensure the adoption of good regulatory frameworks within their borders.

In the paragraphs below, I describe certain key aspects of the regulatory framework that I think may not have received sufficient attention: (a) regulators should focus more on improving incentives; (b) we need to pay more attention to accounting frameworks; and (c) we need some new regulatory frameworks that look more carefully at both the risk properties of particular financial assets and the characteristics of the overall financial system.

Improving incentives

There have been problems in market incentives and regulatory incentives that almost surely played an important role in each of the problems detailed above. For markets to work well, private incentives have to be aligned with social objectives. This has not been the case. Here are a set of reforms that would at least improve the alignment of incentives.

IMPROVED INCENTIVES IN SECURITIZATION

One of the problems with securitization is that mortgage originators did not hold the mortgages, and so had less incentive to ensure that the borrower had the ability to repay. Their incentives were directed at *persuading* the buyer of the mortgages that they had the ability to pay. *Requiring that mortgage originators retain a fraction of the risk of the loans that they originate would encourage greater care in lending.*

IMPROVED INCENTIVES IN RATING AGENCIES

This is one of the two incentive issues that have been widely discussed: with rating agencies being paid by those putting together the complex products, they have an incentive to please those who are paying them. The problems are analogous to those confronting the accounting firms, which Sarbanes-Oxley attempted to address. The fix here is not so easy. There are large numbers of buyers of securities, and it is not obvious how to design a system in which the

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buyers of the securities pay the cost. The problems are related to fundamental problem in the supply of information; it is one of the reasons that in some key areas (like food safety) we do not rely on private certification. There is at least an overlay of government oversight. This is part of the motivation for the financial products safety commission discussed below.

IMPROVED INCENTIVES IN HEDGE FUNDS AND FINANCIAL MANAGERS

Part of the problems in recent years in financial markets may be related to the incentive structures facing hedge fund managers, and financial managers more generally. These are incentive structures designed to enhance risk-taking. The question is, are they encouraging excessive risk-taking, and partly at the expense of the public? The incentive structures encourage gambling. Financial managers can do well for themselves if they make large amounts one year, even if such amounts are offset by equal losses the next. The former results in large bonuses; the latter has no penalty.

It is when the hedge funds interact with regulated financial entities, like banks and fiduciaries, that the problems become particularly acute. Government has imposed regulations on these financial entities for good reason—concern about systemic risk and the protection of the savings of retirees. It is not the intent of government to give opportunities for those in the financial markets to make money through regulatory arbitrage or by taking advantage of implicit or explicit government insurance (bail-outs). But the current system gives them ample opportunity to do so. Accordingly, the incentive pay structures of those hedge funds or financial entities that either receive funds from or provide products to these regulated financial institutions should be regulated. The incentive pay structures within the regulated financial institutions (banks, fiduciaries) should similarly be regulated.

At a minimum, bonuses must be based not on the performance in any single year, but on the performance over a much longer time period; at least a substantial part of the bonus paid in any one year should be held in escrow, to be offset against losses attributable to the investments made in subsequent years.

Critics will worry about the excessive obtrusiveness into the market economy. Is there not a risk that such regulation interferes with innovation—including innovation in incentive structures? There are two answers to such concerns. First, in those parts of the financial system where there is not an overriding public interest, there is still scope for such innovation for testing out new incentive schemes and evaluating them. Second, and more to the point, there are real questions about the nature of the innovations in compensation schemes in recent years. Greater reliance on stock options, *at least for firms that are not cash constrained*, seems more driven by a concern towards deceiving shareholders than to increasing managerial efficiency. The resistance of

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corporations to having the value of stock options disclosed in ways that shareholders can understand is certainly suggestive. A closer look at executive compensation suggests that there is in fact little relationship between pay and long-term performance—in bad years (when the stock does not do well), executives find alternative ways of receiving their compensation. Moreover, there are better ways of providing compensation that provide higher powered incentives with less risk to managers and with tax benefits (see Stiglitz, 2003).

IMPROVED INCENTIVES FOR REGULATORS

The full regulatory authority of the regulators (e.g. of the Fed) was not used to prevent the current problems. It was only after the crisis that the Fed adopted regulations—a classic case of closing the barn door after the horses are out. There is a large literature on regulatory capture; self-regulation typically does not suffice, partly because of incentives (those in the financial markets were making good money; no one wants to be a party pooper), partly because of mind-set (those within the industry are less likely to see a bubble than disinterested third parties).

Those entrusted with regulating the industry have to identify with those who are most likely to lose in the event of a malfunction of the market, not with those who are winning as a result of the malfunction of the market. At the very least, there is a need for greater balance.

In many industries, expertise resides mainly in those in the industry, and this poses a particular problem in the design of regulatory authorities. There are today, however, large numbers of highly qualified individuals who understand financial markets (especially in academia) who could play a more active role in regulation. One would still have to take precautions, e.g. against revolving doors.

CONFLICTS OF INTEREST

Conflicts of interest give rise to distorted incentives. There are several potential conflicts of interests that have surfaced; at this juncture, it is important to ascertain what role they played. Those involved in the mortgage business (at any point in the supply chain) should not have a financial interest in firms that appraise property values. The problems are obvious.

Similarly, for a financial firm to buy “insurance” for its mortgages (bonds) from a company in which it owns a large stake vitiates the purpose of insurance. It is not insurance, but self-insurance. It does not transfer the risk, even if it helps improve “ratings.” But if it does help improve ratings, it is almost surely partially due to failures in the rating methodologies.

At the time Glass-Steagall was repealed, there were worries about a variety of forms of conflicts of interest. In the years since, it appears that some of those worries, at least in some instances, were justified. While there may be no appetite for reinstating restrictions, more thought should be given to

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regulations, with penalties for those that disregard them, that might address some of the problems that have appeared.

Information, accounting and capital adequacy frameworks

Much recent discussion has focused on increased transparency and more extensive disclosure. It has become increasingly clear that disclosure requirements by themselves will not suffice, and that the manner in which information is disclosed makes a difference. The latter point was highlighted by the controversy over disclosure of stock options, and the requirement that they be “expensed.” Many firms that made extensive use of stock options did not object to disclosing that information in footnotes, presumably because they understood that such disclosures would have few consequences; they objected strenuously to even conservative approaches to accounting for these stock options because it would reveal the extent to which ownership claims were being diluted.³²

Accounting is important, because it provides frameworks in which information is presented. On the basis of that information, taxes are levied, firms make decisions—for example, about which activities to expand, and which to contract—and investment gets allocated. Flawed and distorted information leads to flawed and distorted decisions. The problem, repeatedly noted, is that there are incentives to provide flawed and distorted information. Firms have an incentive to provide too low an estimate of profits for tax purposes, and too high an estimate to persuade investors to invest more in their company. These countervailing incentives often act as a check against each other.

In recent years, innovations in accounting (not all of positive value) have enabled some firms to maintain, in effect, multiple books—presenting one set of numbers to tax authorities, another set of numbers to investors. But just as they learned how better to deceive tax authorities (by and large, viewed as a legitimate activity), they learned how better to deceive investors. Making matters worse, distorted compensation systems—including stock options—provided even stronger incentives for providing distorted information.³³

The Enron/WorldCom scandals of the early years of this decade exposed some of these accounting problems. Not enough attention has been paid to the failure of the accounting frameworks in the current context. They signaled huge profits in 2003–06, but did not signal the offsetting even larger losses that have now been exposed. This should not have happened; what it signals is, I think, that something is wrong with the accounting frameworks.

Bad accounting frameworks not only do not provide accurate information; they lead to distorted behavior. Not marking to market, for instance, provides an incentive for excessive risk-taking: one can sell off assets that have gained in value, recording a profit, and hold on to assets that have decreased in value (keeping them at book value.)

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But we are beginning to discover some consequences of (poorly designed) mark to market systems. Banks are now marking to market their liabilities. As their default probability increases, the value of their bonds decreases, and so their balance sheet improves. Bonds, of course, may have covenants that they cannot be bought back at below par—without such covenants, borrowers would have an incentive to announce bad news, to depress the value of their debt, so they could buy it back at below par. Never mind that the fall in the price of bonds indicates that the firm is going to face higher borrowing costs in the future—it is signaling worse future prospects for firms. Under current US rules, the firm can record an improvement in its position.

In the current crisis, off-balance sheet assets were obviously incorrectly priced. Banks could book some of the profits they made in “repackaging” sub-prime mortgages, even though they retained residual risk in these off-balance sheet mispriced assets. It is not clear to what extent these accounting problems simply misled those looking at the banks and to what extent these provided the underlying motivation for the transactions. In any case, it is clear that accounting failures provided scope for the problems that have been uncovered.

While the problems of not marking to market have long been understood, the recent crisis has exposed some of the problems of using marking to market for capital adequacy (highlighting problems that critics actually raised before mark to market was imposed): market prices might *overshoot*, the decline in market prices exceeding the “true” decrease in value, forcing the bank to unnecessarily raise more capital and/or cut back on lending. The cutback in lending would, in turn, lead to further weakening in the economy (it is, perhaps, ironic, that from the champions of markets comes an argument based on market failure). Marking to market may thus exacerbate the automatic pro-cyclical effects of capital adequacy standards.

Given the long standing tendency of financial markets to over expand in booms, there is a need for counter-cyclical controls. One form is cyclically adjusted capital adequacy standards. In the most recent crisis, a simpler set of controls might have sufficed. As the bubble progressed, while the probability of a decline in price increased, the loan-to-value ratios increased. Requiring larger down payments (and assigning disproportionately higher risk to higher loan-to-value mortgages) almost surely would have dampened the bubble.

Designing better provisioning requirements (and adjusting these to the changing circumstances) might both have dampened the fluctuation and ensured that the consequences of the breaking of the bubble were less. While Greenspan often said that one cannot predict with certainty when there is a bubble, as home prices increased (relative to incomes), the likelihood that prices would fall (by any given amount) was increased, and there should, accordingly, have been larger provisions.

By the same token, there are other indications of impending problems, and these ought to be incorporated in provisioning requirement and capital

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adequacy standards. Research suggests that there may be some simple indications of problems. Had these been employed, red flags would have been raised about some of the potential problems. As a World Bank study—headed by Amar Bhattacharya, carried out before the 1997 crisis—indicated³⁴, a strong indicator of a looming problem, for instance, is rapidly expanding credit (in the aggregate, or in particular institutions). The capacity of institutions to expand rapidly and their ability to make sound judgments about credit worthiness is limited. Problems in lending typically do not show up until two or three years after the rapid expansion has begun, so that in such situations the ratio of non-performing loans provides a poor indicator. There is seldom an economic transformation that would warrant this kind of rapid credit expansion. One of the recommendations of the World Bank study was the imposition of “speed bumps,” for instance requiring higher than normal risk adjustments in capital adequacy standards and greater provisioning for such rapid credit expansions.³⁵

New regulatory frameworks

Improvements in incentives and accounting frameworks will help, but they will not suffice. Financial markets have been plagued with manias and bubbles that inevitably burst. One can never be sure that one is in a bubble until after it bursts—but as prices soar beyond historical ranges, the probability that one is in such a bubble increases. For all the sophistication of modern risk management techniques, they have done little to affect the occurrence of these bubbles; perhaps as we learn how to manage risk better, we take more risks, and the new financial innovations have facilitated the ability to take on these additional risks (some argue that the use of modern risk management actually makes crises more frequent). In the case of many of the new financial products, it was difficult to ascertain what was their *economic* function, i.e. they were not really tailoring risk products to meet the particular risk profile of particular investors. Were the assets that were stripped apart reassembled in ways that contributed to a lack of transparency? It is clear that no one really understood fully the risk characteristics. These products, rather than helping individuals manage risks, made it more difficult.

FINANCIAL PRODUCTS SAFETY COMMISSION

Financial markets have innovated, but these innovations have resulted in hundreds of thousands of loans that go beyond individuals' ability to pay. Even many of those that are making their payments are facing hardship, anxiety, and stress. Clearly, the financial sector has not done a good job at analyzing the consequences of the products that they produce. Defective products can clearly have disastrous effects both on those who buy them and on the economy.

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In the current instance, those evaluating risk have made a number of systematic mistakes which we have already called attention to.³⁶

Earlier, I explained the problem of having private sector certification. A financial products safety commission could help fill in the gap, particularly in relationship to products being produced by and invested in by regulated entities. Each product would have to have a stated objective (e.g. in what ways was it helping manage and mitigate risk; what was the risk profile for whom the product was intended). Its risk characteristics would be identified, using conservative models which paid due attention to the failures previously noted. The *Financial Products Safety Commission* would evaluate whether products provided significant risk mitigation benefits of the kind purported by the product. There would be a presumption that there “is no free lunch,” i.e. that higher returns could only be obtained at the expense of greater risk; and a strong presumption against complex products, the full import of which are hard to analyze.

The Financial Products Safety Commission would establish transparency standards that all those dealing with regulated financial entities would have to satisfy (including hedge funds and sovereign wealth funds). It would have the power to ban certain products from the balance sheets of these regulated entities (just as there are currently restrictions on the assets that they can hold.)³⁷

Critics will worry that the Commission will inhibit innovation. As in our earlier discussion of compensation, there are two responses. First, there can still be unrestricted innovation in the unregulated parts of the financial system. Products can be tried out there. They can be evaluated: who is buying them? Do they really understand the risks? Is it meeting some real risk need? Second, we have seen that most of the innovation in recent years—while highly privately profitable—has had questionable social benefits; when the subsequent market turmoil to which these instruments have given rise, the net social return is almost surely negative. Indeed, from a theoretical perspective, it should have been obviously so: much of the finance literature is premised on the assumption of “spanning,” that there is (close to) a full set of securities in the market for addressing most of the relevant risks. It is this assumption that allows the easy pricing of derivatives and other new securities. If that is the case, then the only value of new products is the lowering of transactions costs from “prepackaging” certain risk products—and with relatively efficient capital markets the benefits of pre-packaging are likely to be small. Moreover, when a truly innovative product with social value is created, at most the cost would be a slight delay in its introduction; the social cost of that is likely to be small, in comparison with the costs of the kind of crisis we are now facing. Furthermore, restricting unproductive innovation may finally induce financial markets to direct their attention to providing risk products that are needed to help ordinary individuals manage their wealth, products such as inflation adjusted bonds and GDP bonds. Ironically, financial markets resisted the introduction of these innovative products.³⁸

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The Financial Products Safety Commission, working together with the Financial Systems Stability Commission, would have the responsibility for identifying gaps in the current financial system—risks that are not being handled well (such as risks previously discussed with current mortgages), groups that do not have access to credit—and help design new products that would address these needs. We should remember that the government and government created institutions have traditionally played an important role in key financial innovations—a much greater role than market advocates typically recognize.³⁹ There is no reason to believe that they could not play as important a role in the future as they have in the past.

These reforms are particularly important given the scope for regulatory arbitrage that has been exposed in the recent crisis. Sub-prime mortgages were transformed, as if by financial alchemy, into AAA assets, so that they could be placed in fiduciaries who otherwise would not have been allowed to hold these risky products. Limitations in our accounting system similarly provide scope for “accounting arbitrage.” We understand better now some of the *wrong* motivations for the production of new financial products.

REGULATORY INSTRUMENTS AND THE FINANCIAL MARKETS STABILITY COMMISSION

Not all the regulatory instruments that could have been used have been used to control the bubbles that have imposed such costs on the economy. For instance, increasing collateral requirements (margin requirements, down payments) was a natural instrument to have employed, both in the stock bubble of the 1990s and the housing bubble of today. The problem, noted earlier, is that the Fed (partly out of ideology) has been reluctant to use these instruments.

In the current regulatory framework, the focus is mostly on individual institutions (is a particular bank “safe and sound”). Little attention is placed on the *overall* framework. Financial markets have become increasingly interrelated. One cannot look at the system focusing on banking alone, or on securities markets alone. There is a need for a Commission that looks at the financial markets overall, and assesses whether the various regulatory agencies are doing what they should be doing to maintain financial market stability. The *Financial Markets Stability Commission* would for instance have the responsibility for ensuring that there is not excessive *systemic* leverage. It would look at systemic properties, e.g. how the entire system responds to shocks, looking for policies and institutions that would diminish rather than amplify the effects of any shock. (It would, accordingly, work to ensure that there are not built-in automatic destabilizers, such as associated with inappropriately designed capital adequacy standards.)

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This Commission, like the Financial Products Safety Commission, should not be dominated by those from the financial markets, but should rather be more broadly representative with, for example, economists who take a broader systemic view, and reflect the concerns and views of main street and labor, as well as financial markets.

We noted earlier that regulatory authorities need to pay increased attention to indications of crises (problems of “vulnerability”).⁴⁰ Earlier, we noted one of the factors is rapid expansion of credit. Rapid expansions of credit into new markets (like the sub-prime market) should be the subject of increased regulatory scrutiny. To be sure, we should encourage financial innovation—making credit available to those who previously did not have access can be a valuable social contribution. But sometimes (perhaps often) there was a good reason that credit was not made available—there was a high risk of non-repayment. There is a need for balance and caution—encouragement for the creation of new products, but an awareness of the potential risks.

BOUNDARIES OF REGULATION

Government has a legitimate argument for imposing regulations on entities that threaten the stability of the financial system. There has long been a view that investment banks do not need to be regulated, because their owners, and not the public, bear the risk if they make bad investments. The government financed bail-out of Bear Stearns has lain to rest such claims. The rationale for the government bail-out (as for the government orchestrated bail-out of LTCM) was that there would be systemic consequences if a failure occurred. This means that any entities that are closely interlinked with those parts of the financial system over which government has regulatory responsibility (banks, pension funds, other fiduciaries, etc) need to be regulated. The extent and nature of the regulation should presumably depend on the nature of the systemic risks which problems in each entity (or from correlated behavior in a group of firms) might pose.

Thus, one might argue that gambling between consenting adults should be allowed: only those party to the gamble are at risk. On this reasoning, hedge funds that do not sell financial products to or receive loans from banks or other regulated entities should have at most limited regulations, e.g. certain behaviors might be proscribed. Hedge funds (or similar entities) wishing, however, to sell financial products to or receive loans from banks would have to register as “qualified financial entities,” and be subject to more extensive regulation, including regulations concerning disclosure and incentives.

INTERNATIONAL PERSPECTIVES

Each country, in designing its own regulatory framework, has a tendency to focus on impacts within its own country. Just as each bank ignores the

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externalities to which its actions give rise, so too is true for individual countries. For instance, some countries have expanded their banking system by *regulatory competition*, including weakening regulations designed to ensure compliance with the tax code. There is a worry, noted earlier, that regulatory competition will result in a race to the bottom.

The first best solution would entail coordination in the design of good regulatory standards. The limitations of Basel II have already been mentioned. If appropriate regulatory standards are not established, then it will be necessary for each country to design its own regulations to protect itself. It cannot rely on regulations of others. European banks' losses from sub-prime mortgages now appear to be greater even than those of US banks.

It would be easy to enforce good standards, especially on those countries that have become noted for their role in evading regulations and taxes. There is little reason that so much financial activity occurs in many of these off-shore centers, except to avoid taxes and regulatory oversight; but this undermines the integrity of the global financial system. These off-shore centers survive only because we allow them, and there is no reason that this should continue. The US, for instance, has already shown that it can enforce its standards concerning financial relations with terrorist groups. It could do so as well with those who are engaged more broadly in tax evasion, money laundering, or other such anti-social activities (the recent response of Germany and others to the tax evasion disclosures out of Lichtenstein highlight that much more can be done that has been done in the past). Similarly, restricting regulated American or European financial entities in their dealings with financial institutions and other entities in jurisdictions that have failed to comply with OECD (Organisation for Economic Co-operation and Development) transparency standards or other regulatory standards that US or Europe might agree upon, and which did not cooperate in providing records of accounts to tax authorities in the United States, would shortly either put these "rogue" financial institutions out of business—or force them to change their behavior.

Concluding comments

The United States—and much of the rest of the world—is experiencing a major problem in its financial system, a financial crisis which has evolved into the most serious global economic downturn since the Great Depression. As we have noted, this is at least the third major problem involving US financial institutions in the last quarter century. Not only were they not the font of wisdom in the management of risk that they purported to be, but they did not even understand well the products that they were creating. There will be many innocent victims of these failures—the consequences are not limited to the

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institutions themselves. Taxpayers as a whole are now bearing risks as a result of the financial systems failure to manage its risks.

Doctors learn a great deal from pathologies. So too, economists should learn from the failures of the economic system. We have attempted to provide a broad, theory-based diagnosis of what went wrong, and on the basis of that diagnosis, to prescribe remedies—short-term remedies that will minimize the depth and duration of the downturn, and long-term regulatory reforms that will reduce the frequency and depth of such occurrences in the future. We have looked for reforms that are consistent with other goals, such as promoting innovation, stabilizing the economy, and maintaining some semblance of equity. Realism requires a recognition that even with our most valiant efforts, there will be crises in the future. If we succeed in reducing the riskiness of the system, it will encourage market participants to take more risk. Whatever regulatory system we devise, there will be those who will try to find weaknesses and exploit those weaknesses for their own gain, even if it imposes costs on others—and those in the financial markets will continue to use their financial clout to induce the political processes to make “reforms” (as arguably they did in the repeal of Glass-Steagall) that enhance their profits, at the expense of the well-being of society more generally.

The entire episode exemplifies many of the principles elucidated by the economics of information—yet many of the models explicitly or implicitly in the mind of both regulators and market participants ignored the imperfections and asymmetries of information, to which actions within the financial markets were contributing. Incentives matter, but distorted incentives lead to distorted behavior. Incentives at both the individual and organizational level were distorted. Some of the recent actions taken to address the current problems have the potential of exacerbating these distortions in the future.

The crisis will affect the ongoing debates about the design of economic systems. There will be fewer supporters of unfettered markets. It is clear that markets have not worked precisely in the way that its advocates believed they would. Indeed, today some who said they recognized the high risk associated with high leverage argue they had no choice: their stocks would have been severely punished if they had run against the current, and indeed they may not have survived. The arguments presented earlier make clear how difficult it is to ascertain whether above normal returns are a result of excessive gambling—with a price to be paid in the future—or a result of differential returns to rare insights into the economy. And inevitably, reward structures are more sympathetic to those who failed when everyone else failed in a similar way. This encourages the kind of herd behavior, an example of which we have just seen (see Nalebuff and Stiglitz, 1983).

These are the deeper issues raised by this crisis. But whatever one’s views about these broader issues, there is a growing consensus on the need for reforms in the financial sector. It is ironic that while, supposedly, market institutions have

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improved and our understanding of economics has increased, financial crises have become no less frequent—and in some respects even worse. If confidence in our financial system is to be restored, there needs to be reason to believe that constraints and incentives have been altered in fundamental ways. If we are to make crises less frequent and less severe in the future, we have to think more deeply about the causes of the crises, the pervasive market failures which give rise to them. We have to design regulatory frameworks that address these underlying problems. This paper has attempted to outline what that entails.

Notes

1. Paper prepared for a meeting on Financial Regulation sponsored by the Initiative for Policy Dialogue and Brooks World Poverty Institute, Manchester, July, 2008. The author is indebted to Stephany Griffith-Jones for helpful comments. Financial support from the Ford, Mott, and Rockefeller Brothers Foundations is gratefully acknowledged. Since the paper was originally written, the financial meltdown has in fact turned much worse. I have revised the paper to take into account some aspects of the subsequent events.
2. Columbia University and Brooks World Poverty Institute, Manchester.
3. Potential growth is usually estimated at between 3.0 and 3.5 per cent. In the fourth quarter of 2007, growth was 0.6 per cent, and in the first quarter of 2008 it was 0.7 percent. Consensus forecasts for the remainder of 2008 and into 2009 suggest *at best* anemic growth.
4. For an alternative perspective, see Greenwald and Stiglitz, 2003.
5. Cf. the discussion in the context of the S&L crisis of Akerlof and Romer (1993). The S&L crisis and the Enron (and similar) scandals made clear that the incentives which led to excessive risk-taking were closely related to those that led to fraudulent behavior. In the current crisis, charges of fraud have been brought, for instance, against UBS and some of its traders, for promoting securities that they knew were riskier than they disclosed—much akin to the now famous discrepancies in analysts' statements to each other and to their clients in the dot-com bubble. Though such prosecutions may be helpful, it should be clear that they will not resolve the problems. It will only lead to more careful framing of claims about the attributes of different assets.
6. See Taleb (2007).
7. Such problems are, of course, a reflection of deeper problems in corporate governance, which arise from the separation of ownership and control, to which Berle and Means (1932) called attention. I helped provide modern information theoretic foundations for these issues (Stiglitz, 1985). A large subsequent literature has verified empirically the importance of these concerns. Later, I make reference to the literature showing that observed stock option schemes, for the most part, cannot be viewed as part of an optimal compensation scheme.
8. This does not fully explain the market failures, because markets should have anticipated these problems and taken off-setting measures. They did not, and indeed, modelers used default data from periods prior to securitization to estimate default rates.

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9. One of the proposals for helping address the foreclosure problem is to make it more difficult to sue.
10. Some argue that the conversion from partnerships to corporations by some of the leading investment banks may have provided incentives to “cash in” on their reputation.
11. See Ferri et al. (1999).
12. Though this is no longer the case in the Internal Ratings Based approach adopted by the US.
13. See the excellent chapter in this book by Goodhart on how to improve their behavior.
14. One might argue that this would have been offset by their desire to maintain their reputation. The short-term focus that follows from the market imperfections meant that the concern for loss of reputation may not have been given the weight that it otherwise would. Moreover, when all are engaging in similar practices, there is little risk: where else can they turn? In effect, they are rewarded, and punished, on the basis of relative performance. (See Nalebuff and Stiglitz, 1983a, b)
15. These and related conflicts of interest played a role in some of the worst scandals in the late 1990s, for instance in the allocation of underpriced shares in IPOs to CEOs.
16. Further problems may have been raised by differences in accounting practices and regulations between commercial and investment banks, especially with respect to marking to market. Financial Accounting Standard No 115 offers three alternative ways to account for debt and equity securities depending on the intent for holding them. Choosing among these alternatives becomes less clear, and gaming the system becomes easier, when a bank acts as both a commercial and an investment bank. The full text of FAS 115 may be obtained from <<http://www.fasb.org/pdf/fas115.pdf>>.
17. This gives rise to convex pay-offs, which in turn give rise to excessive risk-taking. The problems arise whenever there is limited liability. Due diligence on the part of those providing capital to the enterprise is supposed to provide at least some check against abuses. Here, deposit insurance reduces, if it does not eliminate, the extent of the check. Those who provide capital to the bank can ignore the risks. This has led some to criticize deposit insurance. As the Bear Stearns and LTCM bail-outs illustrate, governments will bail out any financial institution whose bankruptcy can give rise to a systemic risk. The major players are simply too large to fail, and they, and those who provide them credit, know it. As Jerry Caprio once put it, there are two kinds of countries, those that have deposit insurance and know it, and those who have deposit insurance and don't know it. Moreover, monitoring banks to ensure that they are in a position to repay their deposits is a public good; it is inefficient to rely on each depositor to do its own monitoring. The credit rating agencies' recent performance makes clear the difficulties of relying on the private sector for the risk assessment. There are simply too many conflicts of interest. See also Stiglitz (1993).
18. This was a public orchestrated but private financed bail-out, but the argument for government intervention was that if even one large institution of this kind failed, it could bring down the entire financial system.
19. This point was made forcefully in the IMF bail-outs in the late 1990s: it was clear that while the bail-outs were typically described as bail-outs of the country, they were more accurately described as bail-outs for the lenders. The former was, of course, the view taken by the Treasury (whose interests, not coincidentally, may have been closely

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- aligned with the Wall Street beneficiaries.) I was on the Council of Economic Advisers at the time of the bail-out: we were not totally persuaded.
20. In the Mexican bail-out, critics suggest that the main beneficiaries were Wall Street investors who held the bonds. There is little evidence that the bail-out played an important role in Mexico's recovery. Indeed, it may have hindered the adjustment. See Lederman et al. (2001, 2003).
 21. See, for instance, Greenwald and Stiglitz (2003), Delli Gatti et al. (Year) and Battistona et al. (2007).
 22. That there are deeper market failures should be evident from the Fundamental Theorems of Welfare Economics, which argues that when markets work well, all the relevant information is conveyed by price signals. For a critique of these perspectives, see Stiglitz (1994) and Greenwald and Stiglitz (2003).
 23. This was especially true given the incentive structures. For instance, mortgage brokers originating the mortgages were paid a commission. They faced no penalties in the event of a foreclosure. They had an incentive to oversell, to explain how the markets were going up and would continue to go up, how the more one borrowed the more one made, how there would be no problem in obtaining additional finance when interest rates increased under the reset provisions. In some cases, they may have been deliberately misleading those who they were trying to persuade to borrow; in other cases, they had deceived themselves. The situation was conducive to corruption: enough money to be split among the brokers, the appraisers, the borrowers that all could gain from deception. In some cases, there were overt conflicts of interest—where mortgage originators had financial stakes in the appraisers.
 24. Some of the mortgages did not initially provide 100 per cent financing, but since the initial payments were less than the full interest that should have been due, they represented negative amortization, and the amount owed became greater than the value of the house.
 25. The problems are multiplied further with credit default swaps, which can either be viewed as forms of insurance or bets, amplifying systemic problems.
 26. See Persaud (2000), and Goodhart and Persaud (2008b).
 27. Persaud (2000) has argued persuasively for the advantages of maintaining heterogeneity of views.
 28. Of course, those with different assets and liabilities will face different risks, and the “models” may accordingly pay more attention to the relevant risks.
 29. They were caught in part by their own business model, in which they made money through complexity (product differentiation.) This makes netting out more difficult.
 30. The fact that developing countries continue to have bear the brunt of exchange rate and interest rate fluctuations is another example of the financial markets' failure to transfer risk from those less able to bear it to those more able to do so. See Stiglitz (2006), especially chapter 8, “The Burden of Debt”.
 31. There are other aspects of regulation in the financial (and other) sectors, which we have discussed elsewhere: ensuring competition and consumer (borrower, investor) protection; and ensuring access to credit for underserved groups.
 32. I have discussed the issue of disclosure requirements more extensively elsewhere. See Stiglitz (2009).

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33. One can design incentive systems with less risk and better incentives than traditional stock options. Indeed, these result in corporate executives bearing risks of random stock market fluctuations, unrelated to their activities (including changes in interest rates). In practice, however, stock options have served more as an excuse for high corporate compensation; when shares have fallen, the executives have found other ways of receiving compensation, so that the relation between corporate performance and compensation is relatively weak. See Stiglitz (2003).
34. Private Capital Flows to Developing Countries: The Road to Financial Integration. World Bank Policy Research Report, 1997.
35. A proposal along these lines has been put forward by Goodhart and Persaud (2008a). They focus on the growth of individual bank assets. Attention should also be directed at high growth rates of particular assets, e.g. home mortgages.
36. To recap: (a) They have underestimated the importance of correlated risks, (b) they failed to recognize that securitization increased the problems of information asymmetries, affecting incentives of those originating loans, and (c) they failed to take account of systemic risks and fat tails.
37. Alternatively, it could impose restrictions, limiting purchases to a certain fraction of their portfolios—given the risk that can be hidden inside these products, any purchases should be viewed with care.
38. I saw this first hand when, as a member of the Council of Economic Advisers, I pushed for the introduction of inflation adjusted government bonds. The resistance appeared related to the fact that such bonds have low turnover—i.e. generate less profits for Wall Street. Similarly, when Argentina tried to introduce GDP bonds as part of its debt restructuring (something I had strongly supported), there was great resistance from financial markets.
39. There is a long list: mortgages that are widely available, securitization of mortgages, student loans, small business loans.
40. In the aftermath of the East Asia crisis, a literature developed trying to identify the factors that made a country more vulnerable. See Furman and Stiglitz (1998) and the studies cited there. Interestingly, I suspect in terms of the factors identified there, it should have been apparent that the US was highly vulnerable.

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